

CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1 1. An apparatus for detecting a seal on a film,
2 comprising;
3 a force transmitter, disposed to transmit a
4 force from the film;
5 a force sensor disposed to receive the
6 transmitted force and provide a force signal in
7 response thereto; and
8 a controller, disposed to receive the force
9 signal and provide a seal signal in response thereto.

1 2. The apparatus of claim 1, wherein the force
2 sensor is an acoustic sensor.

1 3. The apparatus of claim 1, wherein the force
2 sensor is a mechanical sensor.

1 4. The apparatus of claim 1, wherein the force
2 sensor is a vibration sensor.

1 5. The apparatus of claim 1, further comprising
2 an anvil disposed on a first side of a film path, wherein
3 the force transmitter is disposed on a second side of the
4 film path.

1 5. The apparatus of claim 1, wherein the force
2 sensor is a piezoelectric sensor.

1 6. The apparatus of claim 5, wherein the force
2 transmitter is a quill disposed near a path of the film.

3 7. The apparatus of claim 6, wherein the quill
4 is rigid.

1 8. The apparatus of claim 7, wherein the quill
2 is comprised of stainless steel.

1 9. The apparatus of claim 6, wherein the quill
2 is angled in a downstream film path direction, relative to
3 normal to the film path.

1 11. The apparatus of claim 10, wherein the quill
2 includes a radius surface abutting the film path, and the
3 quill is held against the film path by a spring force.

1 11. The apparatus of claim 5, wherein the
2 controller includes an amplitude comparator that receives
3 the force signal and an amplitude threshold.

1 13. The apparatus of claim 5, wherein the
2 controller includes a rise-time comparator that receives the
3 force signal and a rise-time threshold.

1 14. The apparatus of claim 1, wherein the
2 controller includes a window circuit.

1 15. A method for detecting a seal on a film,
2 comprising;
3 providing a force signal responsive to the
4 seal; and
5 detecting the force and providing a seal
6 signal in response thereto.

1 16. The method of claim 15, further comprising
2 transmitting a force from the film.

3 17. The method of claim 15, wherein providing the
4 force signal includes detecting an acoustic signal.

1 18. The method of claim 16, wherein providing the
2 force signal includes detecting a mechanical signal.

1 19. The method of claim 16, wherein providing a
2 force signal includes sensing a vibration.

1 20. The method of claim 15, further comprising
2 transmitting the force with a quill disposed near a path of
3 the film.

1 21. The method of claim 15, wherein providing a
2 seal signal includes comparing an amplitude of the force
3 with a threshold.

1 22. The method of claim 21, wherein providing a
2 seal signal includes making the comparison during a window.

1 23. The method of claim 22, wherein providing a
2 seal signal includes comparing a rise-time of the force with
3 a threshold.

1 24. An apparatus for detecting a seal on a film,
2 comprising;
3 means for providing a force signal in
4 response to the seal;
5 means for detecting the force signal, coupled
6 to the means for providing a force signal; and
7 means for providing a seal signal in response
8 to the force signal, coupled to the means for
9 detecting.

1 25. The apparatus of claim 24, further comprising
2 means for transmitting a force from the film to the means
3 for detecting, coupled to the means for detecting.

1 26. The apparatus of claim 25, wherein the means
2 for detecting includes means for detecting an acoustic
3 signal.

1 27. The apparatus of claim 25, wherein the means
2 for detecting includes means for detecting a mechanical
3 signal.

1 28. The apparatus of claim 25, wherein the means
2 for detecting includes means for detecting a vibration
3 signal.

1 29. The apparatus of claim 25, wherein the means
2 for providing a seal signal includes means for comparing an
3 amplitude of the force with a threshold.

1 30. The apparatus of claim 29, wherein the means
2 for providing a seal signal includes means for making the
3 comparison during a window.

1 31. The apparatus of claim 30, wherein the means
2 for providing a seal signal includes means for comparing a
3 rise-time of the force with a threshold.

1 32. A bag machine, comprising;
2 a force transmitter, disposed to transmit a
3 force responsive to a seal;
4 a force sensor disposed to receive the
5 transmitted force and provide a force signal in
6 response thereto;

7 at least one upstream processing device,
8 located upstream of the force transmitter;
9 at least one downstream processing device,
10 located downstream of the force transmitter; and
11 a controller, disposed to receive the force
12 signal and provide a seal signal in response thereto.

1 33. The apparatus of claim 32, wherein the force
2 sensor is a mechanical sensor.

1 34. The apparatus of claim 32, further comprising
2 an anvil disposed on a first side of a film path, wherein
3 the force transmitter is disposed on a second side of the
4 film path.

5 35. The apparatus of claim 34, wherein the force
6 sensor is a piezoelectric sensor.

7 36. The apparatus of claim 35, wherein the force
8 transmitter is a quill disposed near a path of the film.

9 37. The apparatus of claim 36, wherein the quill
10 is angled downstream.

11 38. The apparatus of claim 37, wherein the quill
12 includes a radius surface abutting the film path, and the
1 quill is held against the film path by a spring force.

2 39. The apparatus of claim 38, wherein the
3 controller includes a window circuit.

4 40. The apparatus of claim 32, wherein one of the
5 at least one downstream devices is registered to the seal.

1 41. The apparatus of claim 40, wherein one of the
2 at least one downstream devices includes a knife.

1 42. The apparatus of claim 40, wherein one of the
2 at least one downstream devices and the force transmitter
3 are in a common tension zone.

1 43. A method for processing a bag, comprising;
2 transporting the film from a first processing
3 device to a seal sensing location;
4 providing a force signal responsive to the
5 seal at the seal sensing location;
6 detecting the force and providing a seal
7 signal in response thereto;
8 transporting the film to a second processing
9 device.

1 44. The method of claim 43, further comprising
2 transmitting a force from the film.

1 45. The method of claim 44, wherein providing the
2 force signal includes detecting a mechanical signal.

1 46. The method of claim 43, wherein providing a
2 seal signal includes comparing an amplitude of the force
3 with a threshold.

1 47. The method of claim 46, wherein providing a
2 seal signal includes making the comparison during a window.

1 48. The method of claim 43, wherein providing a
2 seal signal includes comparing a rise-time of the force with
3 a threshold.